AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1-37. (Cancelled)

38.   (New) A cooling system comprising:

a contactor providing a demand signal;

a compressor including a motor operable to power said compressor to an ON condition in response to said demand signal;

a motor protector responsive to motor operating parameters;

logic circuitry operable to diagnose an operating condition based upon a status of said motor protector and a moving window time average of said compressor operating in said ON condition; and

an intelligent device in communication with said logic circuitry and operable to indicate said operating condition.

39.   (New)   The cooling system according to Claim 38, wherein said logic circuitry determines an operating time for said compressor and an idle time for said compressor.

40.   (New)   The cooling system according to Claim 38, wherein said logic circuitry determines a length of time said motor is outside of specified operating parameters.

41.   (New) The cooling system according to Claim 38, further comprising an electrical plug, said logic circuitry being integrated into said electrical plug.

42.   (New) The cooling system according to Claim 38, wherein said logic circuitry is integrated into said contactor.

43.   (New) The cooling system according to Claim 38, wherein said intelligent device receives diagnostic information from said logic circuitry.

44.   (New) The cooling system according to Claim 38, further comprising:

a sensor in communication with said logic circuitry and operable to monitor an operating characteristic of the cooling system wherein said logic circuitry receives said operating characteristic from said sensor and is operable to shut down said compressor based on said operating characteristic.

45.   (New) The cooling system according to Claim 44, wherein said sensor is a pressure sensor operable to monitor a discharge pressure of said compressor.

46.   (New) The cooling system according to Claim 44, wherein said sensor is a temperature sensor operable to monitor ambient temperature.

47.   (New) The cooling system according to Claim 44, wherein said sensor is a voltage sensor operable to monitor electrical voltage being supplied to said motor.

48.   (New) The cooling system according to Claim 44, wherein said logic circuitry uses said demand signal in conjunction with said sensor to monitor said operating characteristic.

49.   (New) The cooling system according to Claim 44, wherein said sensor is a current sensor operable to monitor electrical current supplied to said motor.

50.   (New) The cooling system according to Claim 49, wherein said logic circuitry determines said status of said motor protector based on input from said current sensor.

51.   (New) A diagnostic system for a compressor system including a compressor and a motor protector, the system comprising:

at least one sensor monitoring operating conditions of the compressor;

logic circuitry associated with said at least one sensor and the motor protector, said logic circuitry operable to determine a trip frequency of the motor protector and identify a specific fault cause; and

an intelligent device in communication with said logic circuitry and operable to indicate said fault cause.

52.   (New) The diagnostic system of Claim 51, wherein said logic circuitry analyzes said condition and said intelligent device indicates a specific fault cause.

53.   (New) The diagnostic system according to Claim 51, wherein said logic circuitry determines the trip frequency of the motor protector.

54.   (New) The diagnostic system according to Claim 51, wherein said logic circuitry determines the average ON time of the compressor.

55.   (New) The diagnostic system according to Claim 51, wherein said intelligent device is operable to visually communicate said specific fault cause.

56.   (New) The diagnostic system according to Claim 51, wherein said logic circuitry is operable to output to said intelligent device a coded sequence of electrical pulses to identify said specific fault cause.

57.   (New) The diagnostic system according to Claim 51, wherein said at least one sensor includes a demand signal sensor associated with said logic circuitry.

58.   (New) The diagnostic system according to Claim 57, wherein said demand signal sensor monitors a supply voltage.

59.   (New)   The diagnostic system according to Claim 57, wherein said demand signal sensor is in communication with a system controller supplying a signal indicating demand.

60.   (New) The diagnostic system according to Claim 57, wherein said at least one sensor includes a current sensor associated with said logic circuitry.

61.   (New)   The diagnostic system according to Claim 60, wherein said logic circuitry receives an output of said current sensor, an output of said demand sensor and derives a motor protector trip frequency from said received current and demand signal.

62.   (New) The diagnostic system according to Claim 60, wherein said current sensor includes a main winding current sensor and an auxiliary winding current sensor, said logic circuitry communicating said condition based on input received from said demand signal sensor, main winding current sensor and auxiliary winding current sensor.

63.   (New) The diagnostic system according to Claim 62, wherein said logic circuitry is operable in a normal run condition, said logic circuitry moving the protector to a tripped condition in the absence of a signal from both said main winding current sensor and said auxiliary winding current sensor.

64.   (New) The diagnostic system according to Claim 62, wherein said logic circuitry is operable in a protector trip condition, said logic circuitry outputting a normal run condition signal when receiving output from at least one of said main winding current sensor and said auxiliary winding current sensor and output from said demand sensor is acceptable.

65.   (New) The diagnostic system according to Claim 62, wherein said logic circuitry derives a motor protector trip frequency from said input received from said demand signal sensor and at least one of said main and auxiliary winding current sensors.

66.   (New) The diagnostic system according to Claim 62, wherein said intelligent device is operable to indicate a fault based on input received by said logic circuitry from at least one of said demand signal sensor, main winding current sensor, and auxiliary winding current sensor.

67.   (New) A method comprising:

   sensing at least one operating condition of a compressor;

   analyzing said operating condition;

   determining a trip frequency of a motor protector;

   identifying a compressor fault cause based on said operating condition and said trip frequency; and

   communicating said fault cause to an intelligent device.

68.   (New)   The method of Claim 67, wherein said determining includes determining an average ON time of said compressor.

69.   (New)   The method of Claim 67, wherein said sensing at least one operating condition includes sensing a demand signal and a current.

70.   (New) The method of Claim 69, further comprising deriving said motor protector trip frequency from said sensed current and demand signal.

71.   (New)   The method of Claim 67, wherein said identifying a compressor fault cause includes indicating a specific fault cause based on said sensed operating condition.

72.   (New)   The method of Claim 67, wherein said communicating includes outputting a coded sequence of electrical pulses to identify a specific fault cause.

73.   (New) The method of Claim 67, further comprising displaying said fault cause.